



Debt Financing and Profitability of Listed Manufacturing Firms at the Nairobi Securities Exchange, Kenya: An Empirical Analysis

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Declining profitability in NSE-listed manufacturing firms like Mumias Sugar and Eveready East Africa has discouraged investment and hampered Kenya's economic growth. Despite extensive research on capital structure, a gap remains in understanding how debt financing specifically influences profitability, particularly return on assets (ROA), among NSE-listed manufacturing firms. This study examined the impact of debt financing on ROA, focusing on long-term debt, short-term debt, and the debt tax shield. The research was anchored on trade-off theory, agency theory, and

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Modigliani and Miller's capital structure irrelevance theory. An explanatory research approach was employed, analyzing financial data from nine listed manufacturing firms from 2010 to 2022. A census sampling technique included all nine firms, and data was analyzed using Stata version 17 with panel regression analysis. Diagnostic tests conducted included multicollinearity, Hausman, heteroskedasticity, and normality tests. Findings revealed that both short-term and long-term debt had a statistically significant negative impact on ROA, indicating that higher debt levels reduced profitability. Conversely, the debt tax shield had an inverse but statistically insignificant effect, suggesting that tax benefits from debt financing did not significantly enhance profitability. The study recommends that financial managers explore alternative financing strategies such as equity financing or internal capital generation rather than broadly reducing debt. Additionally, firms should strategically balance their short-term and long-term debt to optimize financial performance while mitigating financial risks.

Keywords: Debt financing; profitability; NSE; manufacturing firms; long-term debt; short-term debt; debt tax shield; panel regression.

1. INTRODUCTION

The manufacturing sector plays a crucial role in economic development by creating jobs and enhancing resource efficiency (Karuma, et al, 2018). However, since 2019, global manufacturing output has declined due to Brexit uncertainty and the U.S.-China trade conflict (KAM, 2020). The decline worsened in early 2020, with industrialized economies experiencing reductions of 6.1%, 11.2%, and 1.1%, respectively. The COVID-19 pandemic further disrupted production as lockdown measures were implemented (KNBS, 2020). In Kenya, the sector faced major challenges from 2003 to 2018, leading to a decline in its contribution to GDP. Key issues included fluctuating interest rates, delayed value-added tax (VAT) refunds affecting cash flow, and stringent county policies that increased investment costs (Anzetse, et al, 2016). In response, both public and private stakeholders introduced policies to support manufacturing, including funding initiatives (KNBS, 2020).

Access to financing significantly impacts manufacturing firms' ability to invest and operate effectively. While formal manufacturers can obtain financing, high collateral requirements and unfavorable loan conditions hinder access. Kenyan firms struggle with high interest rates and short debt durations, unlike overseas competitors who access funds at rates as low as 2-3% (Anzetse, 2016). In Kenya, interest rates can reach 18%, with microfinance institutions charging even higher rates, making financing one of the biggest managerial challenges in the sector (Mburu & Ngatia, 2019).

Despite government efforts to improve the business environment, manufacturing profitability

has remained below expectations (Cheptum, 2019). The sector's contribution to GDP has stagnated, declining from 11.16% in 2010 to 7.36% in 2021 before slightly rising to 7.84% in 2022—far below the targeted 15% by 2022 (KNBS, 2022). Additionally, Kenyan manufacturers operate at an average total factor productivity of 59%, significantly lower than Malaysian counterparts, raising concerns about achieving Vision 2030 goals (Achuora et al., 2015; Karamu et al., 2018). Without substantial reforms in financial access and policy implementation, the sector's growth will remain constrained, limiting its contribution to economic development.

Debt financing occurs when a corporation borrows money from external sources to address both short-term and long-term financial needs. It is typically categorized into short-term debt, which must be repaid within a year, and long-term debt, which extends over several years. Many businesses rely on loans for expansion and asset acquisition, with debt financing often preferred over equity financing due to its tax advantages, particularly the ability to deduct interest payments. In Kenya, debt financing has grown significantly, with commercial banks and financial institutions increasing their lending from KES 237.4 billion in 2017 to KES 462.6 billion in 2021. However, the impact of this increasing debt on performance and profitability remains unclear.

Long-term debt includes bank loans and debentures and is measured as the ratio of non-current liabilities to total assets. There has been a notable increase in long-term credit financing for manufacturing firms, as seen in East African Breweries Limited (EABL), whose long-term liabilities rose by 54% from KES 5.2 billion in

2019 to KES 8 billion in 2020. Short-term debt, which finances operations for less than a year, includes accounts payable, bank overdrafts, and short-term loans. It is often easier to manage since interest is typically not charged until maturity. Studies indicate that funding assets with current liabilities can improve firm performance. Between 2010 and 2017, short-term debt financing grew, with manufacturing companies increasingly adopting this financing model. For instance, Unga Group Limited's current liabilities surged by 53.32% from 2020 to 2021, while EABL's short-term liabilities increased by 19%, from KES 31.1 billion in 2019 to KES 36.9 billion in 2020.

Debt financing is generally more cost-effective than equity financing because it is tax-deductible. However, firms must balance their capital structure to optimize tax benefits while avoiding excessive leverage, which can decrease firm value. The concept of the debt tax shield, which allows firms to deduct interest payments before taxes, has been widely studied. Modigliani and Miller (1963) argued that debt tax benefits enhance firm value, and subsequent research supports the notion that higher corporate tax rates correlate positively with debt levels. The debt tax shield has also been recognized as a tool to counteract declining corporate tax revenues due to global tax rate reductions.

Profitability, the ability of a firm to generate income exceeding its expenses, is a critical performance indicator. While managers focus on profit growth, declining profitability can highlight underlying issues. Scholars use various metrics such as net profit, return on assets (ROA), and return on equity (ROE) to assess financial success (Gitman & Zutter, 2021). Kenya's manufacturing sector has experienced fluctuating growth, with a decline from 3.6% in 2015 to 0.2% in 2017 (Kenya National Bureau of Statistics [KNBS], 2018). In recent years, many firms have recorded low profits, with some experiencing persistent losses. ROA has been on a downward trend for manufacturing firms listed on the Nairobi Securities Exchange (NSE). For instance, BOC's ROA fell from 1.4% in 2017 to 2.3% in 2019, while Unga Group's net income fluctuated, experiencing a sharp decline of -82.27% in 2020 (Unga Group Annual Report, 2021). Mumias Sugar recorded a worsening ROA, dropping from -37% in 2017 to -75.32% in 2018 (Mumias Sugar Financial Report, 2019). EABL's ROA also declined from 45% in 2017 to 7.8% in 2020. These declining profitability trends raise questions about the impact of varying debt

levels on firm performance. Overall, while debt financing provides businesses with an essential funding mechanism and tax benefits, excessive leverage can negatively affect financial performance (Modigliani & Miller, 1958). Firms must strategically balance their debt and equity financing to optimize profitability while managing risks associated with high debt levels.

Kenya's manufacturing industry has been expanding to serve local, regional, and global markets, producing agricultural goods, edible oils, cars, and flour, among other commodities. The government's Big Four Agenda has prioritized manufacturing to drive economic growth, with Vision 2030 aiming to increase its contribution to GDP to 15%. However, the sector has underperformed, jeopardizing Kenya's industrialization ambitions. Listed manufacturing firms at the Nairobi Securities Exchange (NSE) fall under the manufacturing and allied category, with nine firms currently listed. Several firms have faced temporary suspensions from trading between 2011 and 2019, including Mumias Sugar Company PLC, which was halted in 2018–2019 due to financial distress. These suspensions have led to declining profitability, slower GDP growth, and a loss of shareholder wealth.

Debt financing has been a long-debated subject in corporate finance, focusing on its implications for firm profitability. Research has shown that corporate organizations rely significantly on debt, with global total debt averaging 41% and advanced economies at 35%. The relationship between debt financing and profitability remains controversial, with studies presenting mixed results. Some research, such as Ikapel and Kajirwa (2017) in Colombia, found a negative relationship between debt financing and profitability, highlighting risks such as increased interest costs and repayment challenges. Conversely, local studies, including Mutua & Atheru (2020), suggest that debt financing has improved the profitability of NSE-listed industrial firms, revealing a knowledge gap that warrants further study.

For firms to effectively utilize debt financing, adopting an effective tax rate as part of the debt tax shield is crucial. The effective tax rate measures how much tax a business actually pays as a percentage of its taxable income, considering deductions, credits, and exemptions. Key components include corporate income tax, payroll taxes, and property taxes. Understanding a company's effective tax rate is essential for

profitability analysis, investor decision-making, and tax planning. It provides a clearer picture of actual profitability, helps investors compare firms across industries, and enables businesses to optimize tax strategies for cost savings.

1.1 Research Problem

Despite substantial government investments in creating a business-friendly environment, Kenya's manufacturing industry has faced declining profitability. While some firms have exceeded expectations, many have experienced losses, raising concerns about the impact of financial decisions on profitability, especially during economic downturns. Companies like Eveready East Africa and Mumias Sugar were delisted from the Nairobi Securities Exchange (NSE) due to persistent losses, despite government intervention. For instance, Mumias Sugar reported a loss of Ksh 15.1 billion in 2017–2018, worsening from Ksh 6.8 billion in 2016. Financial restructuring has been a major strategy to revive struggling firms, but many continue to underperform.

Despite increased credit access, most listed manufacturing firms have recorded declining Return on Assets (ROA), contrary to government expectations for GDP growth and stakeholder confidence. Investor trust has weakened due to poor financial performance, as seen in firms like EABL, whose ROA fluctuated between 13% and 7.8% in 2019–2020. Similarly, Mumias Sugar's ROA dropped from -37% in 2017 to -75.32% in 2018, while Unga Group's profitability declined from -32.79% in 2019 to -82.27% in 2020.

Extensive research has examined the impact of debt financing on profitability, but findings remain inconclusive. Many studies rely on unclear profitability metrics, such as net profit margin, leading to inconsistent results. Additionally, some studies, like Gisele, et al (2021), overlooked debt benefits like the tax shield. Methodological issues, hidden variable biases, and contextual gaps—where most studies were conducted outside Kenya—further complicate conclusions. This study addresses these gaps by analyzing the effect of debt financing on the profitability of NSE-listed manufacturing firms from 2010 to 2022, aiming to provide clearer insights into the relationship between debt and business performance.

1.2 Research Objective

This study was guided by the following general objective to: assess the impact of debt

refinancing on the profitability of industrial companies listed on the Nairobi Securities Exchange.

Specific Objectives were to; determine the effect of short-term debt on the profitability of manufacturing firms listed in the NSE, Kenya, to examine the effect of long-term debt on the profitability of manufacturing firms listed in the NSE, Kenya and to assess the effect of debt tax shield on the profitability of manufacturing firms listed in the NSE, Kenya.

1.3 Research Hypothesis

This study was guided by the following Research Hypothesis.

H₀₁: Short term debt has no significant effect on the profitability of manufacturing firms listed in the NSE, Kenya.

H₀₂: Long term debt has no significant effect on the profitability of manufacturing firms listed in the NSE, Kenya.

H₀₃: Debt tax shield has no significant effect on the profitability of manufacturing firms listed in the NSE, Kenya.

1.4 Justification of the Study

This research is valuable for policymakers in developing laws that enhance manufacturing enterprises' access to finance, improving their performance and contributing to economic growth. It facilitates informed discussions on corporate finance, including debt financing options, tax benefits, and policy proposals. Additionally, investment firms interested in listed manufacturing companies will benefit from insights into debt financing, aiding strategic decision-making. The study's findings provide a foundation for financial policy improvements and investment strategies in the manufacturing sector.

2. LITERATURE REVIEW

2.1 The Relationship Between Debt Financing and Financial Performance of Manufacturing Firms

2.1.1 Theoretical literature

This study is grounded in three key financial theories: agency theory, trade-off theory, and the capital structure irrelevance theory of Modigliani and Miller. These theories provide a framework for understanding how financial decisions impact business performance and growth.

Agency Theory: Proposed by Jensen and Meckling (1976), agency theory suggests that a certain level of debt in a company's financial structure can help reduce agency costs. Lower agency costs, resulting from minimized agency conflicts, enhance financial performance by aligning managerial actions with organizational goals. The theory addresses the challenge of ensuring that agents (managers) act in the best interest of principals (owners or shareholders). Smith (1937) initially identified agency conflicts within organizations, laying the foundation for this theory. Jensen and Meckling (1976) emphasized that firms operate as "black boxes" focused on maximizing shareholder wealth. Coordination among stakeholders is essential for revenue maximization, but conflicting interests often arise due to varying objectives. This theory is particularly relevant to the study as it highlights the importance of resolving stakeholder conflicts to increase firm value. By mitigating agency problems, businesses can stabilize profitability, making agency theory instrumental in analyzing financial decision-making within organizations.

Trade-Off Theory: Kraus and Litzenberger (1973) introduced the trade-off theory, which explains how firms balance equity and debt financing by weighing the associated costs and benefits. Myers (1984) later expanded the theory by incorporating costs arising from information asymmetry and agency conflicts. The trade-off theory posits that debt financing has both advantages and disadvantages, primarily related to taxation. According to Jahanzeb, et al (2014), optimal leverage is achieved when interest payment benefits and debt issuance costs are balanced. This equilibrium influences a firm's financial growth by maximizing tax benefits while minimizing financial distress costs.

Many firms use debt financing to leverage tax advantages associated with interest payments (Nwanna & Ivie, 2017). However, the assumption that highly profitable companies maintain conservative capital structures has faced criticism. Some studies argue that firms should employ higher debt levels to enhance performance through corporate tax deductions (Salami & Iddirisu, 2011). Previous research (Karuma et al., 2020; Wambua, 2019) has linked profitability and debt financing, supporting the trade-off theory's relevance. Despite its benefits, firms may face obstacles such as high transaction costs and managerial reluctance in implementing optimal capital structures (Shyam-Sunder & Myers, 1999).

For manufacturing companies, the trade-off theory is useful in determining optimal debt levels to maximize tax advantages from interest payments. Firms must decide whether to finance their operations through equity or debt based on interest rates and repayment terms. Interest payments reduce taxable income, thereby increasing retained earnings and firm value. Consequently, manufacturing companies leveraging debt effectively can achieve higher returns on assets (ROA), demonstrating strong profitability. This study examines long-term debt and debt tax shields in line with this theory.

Modigliani and Miller Capital Structure Irrelevance Theory: Modigliani and Miller (1958) introduced the capital structure irrelevance theory, arguing that a firm's financial structure does not affect its value in a perfect market with no transaction costs and full information access. They posited that the benefits of debt are offset by a corresponding increase in equity risk, thereby maintaining firm value regardless of financing choices. However, Modigliani and Miller (1963) later acknowledged that when taxes are considered, debt financing provides a tax shield, making debt more attractive.

Khan (2018) supported the notion that firms continuously seek to minimize capital costs through interest tax deductions. The theory suggests that companies should increase debt levels to optimize capital structure and enhance financial performance. Empirical evidence indicates a correlation between short-term debt and firm profitability, reinforcing the idea that firms benefit from tax shields. This theory is relevant to the study, particularly regarding the preference for debt due to its tax advantages. Consequently, this research examines the impact of short-term debt on corporate performance, guided by the Modigliani and Miller framework. These three theories collectively inform the study's analysis of financial decision-making and its impact on business performance. By understanding agency costs, tax benefits, and capital structure dynamics, firms can develop effective financial strategies to enhance profitability and growth.

2.2 Empirical Review

Empirical literature on the effect of debt financing on company profitability has been widely studied across various contexts. Hasan et al. (2021) examined data from the Bursa Malaysia stock exchange, focusing on 23 food and beverage

(F&B) companies from 2010 to 2017. Their findings indicated a significant causal relationship between long-term debt and profitability. However, their research was geographically limited, prompting the current study to focus on Kenyan firms. Similarly, Achola (2021) analyzed the impact of financial management on micro and small enterprises (MSEs) using a descriptive survey of 302 MSEs. The findings suggested that debt capital significantly reduced profitability at a 5% significance level. However, this study did not address medium and large-scale firms, a gap that the present study aims to fill.

Fatoki and Kibunja (2020) explored the effect of debt financing on non-financial firms listed on the Nairobi Securities Exchange (NSE). Using panel data regression, they found a positive but statistically insignificant relationship between long-term debt ratio and return on equity (ROE). Their study covered all publicly traded non-financial companies, differing from the current study, which focuses on listed manufacturing firms. Atheru and Mutua (2020) examined capital structure decisions and financial performance in Kenyan manufacturing firms. Using multiple regression analysis, they found that long-term debt positively influenced firm performance. However, their study did not consider the tax shield effect, which the current study aims to explore.

Pradhan et al. (2019) analyzed the impact of debt financing on profitability in Pakistani commercial banks using Pearson correlation and multiple regression analysis. Their findings suggested an inverse relationship between financial success and long-term debt, reinforcing the idea that expanding low-interest short-term debt utilization enhances firm performance. However, the study focused solely on commercial banks, whereas the present study targets listed manufacturing firms in Kenya. Aziz (2019) also examined debt financing's effect on return on assets (ROA) among 14 non-financial sectors listed in Pakistan Stock Exchange from 2006 to 2014. The study found a negative impact of debt financing on financial performance, but its conclusions may not be directly applicable to Kenyan firms.

Njeru et al. (2018) investigated commercial debt's effect on Kenyan petroleum marketing companies' profitability. Using thematic analysis and univariate tests such as t-tests and Pearson correlation, they found that commercial debt financing significantly reduced profitability.

Expanding the scope beyond a single sector was recommended, which the present study addresses. Similarly, Omete and Isabwa (2017) examined long-term debt's impact on financial performance in Kenya's state-owned sugar companies between 2004 and 2014. Using a retrospective research design and linear regression, they found a strong negative connection. However, their focus on sugar companies limits the generalizability of their findings to other manufacturing firms. Yazdanfar and Ohman (2015) studied the impact of debt levels on small and medium-sized enterprises (SMEs) in Sweden from 2009 to 2012. Their findings indicated that long-term debt negatively affects overall profitability. This study differs as it focuses on Kenyan firms rather than Swedish SMEs.

Regarding short-term debt, Zeitun and Goaid (2022) examined its inverse relationship with profitability in Japan using data from 1,670 listed firms. Their results indicated a nonlinear impact of short-term debt on company performance, but the study overlooked other forms of debt, a gap the current study aims to address. Chandra and Juliawati (2020) analyzed both short- and long-term debt effects on earnings in Indonesian manufacturing companies listed on the Indonesia Stock Exchange from 2014 to 2018. Using secondary data from 432 firms, they found that both forms of debt had adverse effects on profitability. This study extends their work to Kenyan firms.

Shikumo et al. (2020) explored the relationship between company growth and short-term debt financing for non-financial NSE-listed firms in Kenya from 2008 to 2017. Using an explanatory research design, they found that short-term debt had a significant positive effect on firm growth. However, their study considered short-term debt as the sole determinant of financial performance, whereas the current study incorporates additional variables. Ahmed and Siddiqui (2019) focused on textile firms in Pakistan from 2010 to 2015, finding a negative correlation between short-term credit and firm performance. The present study differs by analyzing Kenyan firms instead of Pakistani textile enterprises.

Ajibola et al. (2018) analyzed the capital structure of listed Nigerian industrial firms from 2005 to 2014. Their findings indicated a weak but positive relationship between short-term debt and return on investment (ROI). However, their focus on Nigerian firms presents a contextual gap that

the current study addresses. Similarly, Habib et al. (2016) examined debt financing's effect on 340 Pakistani non-financial firms using a panel research design. Their findings indicated a significant but negative association between profitability and short-term debt. This study focuses on publicly traded manufacturing firms in Kenya.

Asare and Angmor (2015) studied SMEs in Ghana's Accra Metropolis from 2004 to 2013, analyzing the effect of loan financing on profitability. Using total credits as an indicator of debt financing and asset ratios as profitability metrics, they found a significant inverse correlation between short-term loan ratios and profit margins. However, the study's focus on SMEs left a conceptual gap that the present study addresses. Lastly, Wamugo et al. (2014) examined the relationship between capital structure and performance in non-financial companies listed on Kenya's NSE. Their findings indicated that increasing current liabilities to finance assets improved firm performance. However, the study focused on non-financial firms, whereas the present study examines listed manufacturing firms to fill a contextual gap. Existing literature suggests varying effects of long-term and short-term debt on firm profitability, depending on the industry and country context. While some studies found a positive relationship, others reported a negative or statistically insignificant connection. The current study aims to contribute to this body of knowledge by focusing on Kenyan listed manufacturing firms, addressing gaps in geographic context, firm size, industry focus, and methodological approaches.

3. METHODOLOGY

The study adopted an explanatory research design to explore and provide explanations for observed phenomena in Kenyan manufacturing enterprises. This design aimed to answer "why" and "how" questions by analyzing existing data from previous research studies and statistical surveys. The study assessed the challenges faced by Kenyan manufacturing firms, focusing on financial aspects and performance metrics.

The target population comprised nine manufacturing firms listed on the Nairobi Securities Exchange (NSE) as of December 31, 2022. These companies were selected due to their credibility and the availability of audited financial statements, ensuring reliability and

accuracy in data collection. Given the small number of listed manufacturing firms, a census approach was adopted, allowing for an in-depth examination of all nine firms.

The study relied entirely on secondary data rather than primary data collection. A document review guide was used to extract information from the audited financial reports of the selected firms, covering key financial variables such as earnings before interest and tax, profit before tax, short-term liabilities, income tax expense, and long-term liabilities. The data spanned a 13-year period from 2010 to 2022 and was obtained from firm websites and NSE reports, ensuring comprehensiveness and consistency.

Data analysis involved organizing and sorting the collected data into tables for quick interpretation. Statistical software, Stata, was employed to conduct both descriptive and inferential analysis. Descriptive statistics included measures such as mean, standard deviation, maximum, and minimum values. Panel regression analysis was utilized to test hypotheses at a 5% significance level, providing insights into relationships between financial variables.

Several diagnostic tests were performed to ensure the validity of the regression analysis. The multicollinearity test, conducted using variance inflation factors (VIF), checked for correlation among independent variables, as high multicollinearity could lead to inaccurate estimates. The normality test, performed using the Skewness/Kurtosis method, assessed whether the data followed a normal distribution, with a probability value greater than 0.05 indicating normality. Heteroskedasticity, which refers to inconsistent residual variances across observations, was examined using the Breusch-Pagan/Cook-Weisberg test to confirm data reliability. The Hausman test was applied to determine whether a fixed or random effects model was suitable for panel regression analysis. If the significance level exceeded 5%, the null hypothesis favoring a random effects model was not rejected; otherwise, a fixed effects model was adopted.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

The analysis identified key data components used in the study, sourced from the websites of nine NSE-listed companies. Descriptive statistics were applied to examine the relationship

between debt financing and profitability, considering variables such as earnings before interest and tax, profit before tax, short-term liabilities, income tax expense, and long-term liabilities. The findings indicated that the average return on assets (ROA) was low, with debt tax shield at 0.301, long-term debt at 0.178, and short-term debt at 0.276. Over the 2010–2022 period, manufacturing firms had a minimum ROA of 0.0230, a maximum of 0.316, and a mean of 0.142 with a standard deviation of 0.075, indicating significant variability. Short-term debt averaged 0.276, with a minimum of 0.026 and a maximum of 0.472, showing firms' reliance on current liabilities for asset financing. The long-term debt ratio to total assets averaged 0.178, with a standard deviation of 0.148, indicating minimal variability. The debt tax shield ratio averaged 0.301, with a minimum of 0.114 and a maximum of 0.413. These findings suggest that some firms relied heavily on long-term debt while others used less, contributing to differences in profitability across firms. Overall, the financial performance of the firms was inadequate.

4.2 Multiple Regression Analysis

The regressions tested hypotheses and examined the influence of independent variables on the dependent variable. The multiple panel regression model was expressed as: $Profitability_{it} = \alpha_i + \beta_1 ShortTermDebt_{it} + \beta_2 LongTermDebt_{it} + \beta_3 DebtTaxShield_{it} + \epsilon_{it}$, where $Profitability_{it}$ (e.g., return on assets) is the dependent variable, and the independent variables include $ShortTermDebt_{it}$, $LongTermDebt_{it}$, and $DebtTaxShield_{it}$. Firm-specific fixed effects (α_i) capture unobserved heterogeneity, while ϵ_{it} accounts for other unexplained factors. The regression results are presented in Table 2.

4.3 Diagnostic Tests

This study examined the impact of debt refinancing on the profitability of industrial companies listed on the Nairobi Securities Exchange. Descriptive statistics helped summarize research findings, while inferential analysis established correlations between independent and dependent variables. The study focused on debt, long-term, and short-term tax shields as key factors. Before inferential analysis, diagnostic tests—including multicollinearity, Hausman, heteroskedasticity, and normality tests—were conducted to ensure data suitability. These tests validated the data's reliability, enabling accurate conclusions and recommendations on debt refinancing and profitability in manufacturing firms.

Multicollinearity Test: Regression analysis can be misleading if correlations between independent variables affect causal measurements. To prevent this, a multicollinearity test was conducted using Variance Inflation Factor (VIF) and Tolerance tests. These tests help determine if collinearity exists, ensuring the data's suitability for analysis. Table 3 presents the results, confirming the reliability of the regression model by eliminating concerns about multicollinearity.

Normality Test: Normality tests were conducted to verify whether the observations in the regression model followed a normal distribution. Math-Statistics-Tutor (2010) emphasized their importance in preventing assumption violations. To assess the normality of the dependent variable (profitability of NSE-listed companies), Kolmogorov-Smirnov and Shapiro-Wilk tests were applied. This ensured an effective regression analysis, confirming that residuals were normally distributed, as illustrated in Fig. 1.

Table 1. Analysis of All Variables

Variable	Obs	Mean	Std.Dev.	Min	Max
ROA	9	.142	.075	.0230	.316
Short-term debt	9	.276	.139	.026	.472
Long-term debt	9	.178	.148	.016	.492
Debt tax shield	9	.301	.057	.114	.413

Source: Researcher (2024)

Table 2. Multiple Regression Coefficients

Predictor	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Error	Beta		
Constant	0.2505	0.0567		4.42	0.000
Short-term debt	-0.2343	0.1157	0.018	-2.03	0.037
Long-term debt	-0.1448	0.0767	0.083	-1.89	0.043
debt tax shield	-0.1459	0.0572	-0.007	-1.25	0.212

Source: Research Data (2024)

Table 3. Multicollinearity Test

Variable	Collinearity Statistics	
	Tolerance	VIF
Short Term Debt Ratio	1.52	0.657
Long Term Debt Ratio	1.51	0.660
Debt Tax Shield	1.53	0.656

a. Dependent Variable: profitability
Source: Researcher (2024)

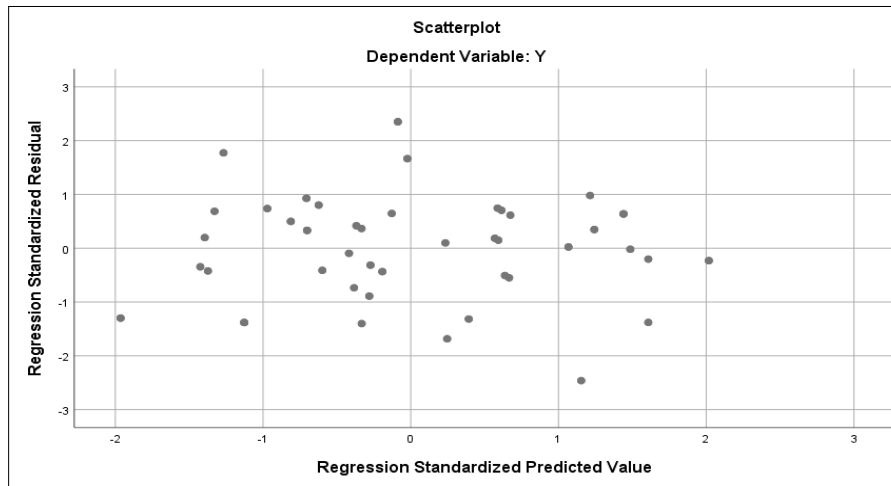


Fig. 1. Normality Test Residual Plot
Source: Researcher, (2024)

Table 4. Kolmogorov-Smirnov Test

	Kolmogorov-Smirnov ^a		
	Statistic	df	Sig.
Unstandardized Residual	0.48	8	0.056
Standardized Residual	0.48	8	0.056

Source: Researcher, (2024)

Kolmogorov-Smirnov Test: The normality of data was confirmed by the gradual tapering of histogram tails, indicating no extreme outliers. The Kolmogorov-Smirnov test further validated normality, as shown in Table 4, where the p-value (0.056) exceeded the significance level (0.05). This confirmed that the data followed a normal distribution, aligning with the residual plot and histogram findings.

The skewness/kurtosis test for normality indicated that the residuals followed a normal distribution since the p-value exceeded 0.05, leading to the failure to reject the null hypothesis. For heteroskedasticity, the Breusch-Pagan/Cook-Weisberg test yielded a chi2 value of 6.80 and a p-value of 0.0091, indicating heteroskedasticity and leading to the rejection of the null hypothesis of constant variance. The Hausman test was conducted to determine the appropriate panel regression model between fixed and random effects. Since the p-value (0.6766) exceeded

0.05, the null hypothesis was not rejected, favoring the random effects model for analysis.

4.4 Testing of Hypotheses

The study examined the impact of short-term debt on the profitability of manufacturing firms listed at the Nairobi Securities Exchange (NSE). The findings revealed that a unit increase in short-term debt led to a 0.2343 percentage point decrease in profitability, indicating a statistically significant negative effect. This aligns with the capital structure irrelevance theory proposed by Modigliani and Miller (1963), which argues that the amount of debt in a firm's capital structure does not affect its value. Several studies, including those by Ahmed & Siddiqui (2019) and Habib et al. (2016), support these findings by demonstrating an inverse relationship between short-term debt and return on assets (ROA) among non-financial firms in Pakistan. However, other studies, such as those by Balami and

Koirala (2024), indicate a positive relationship, suggesting that short-term debt can efficiently finance working capital and enhance profitability. This view is further reinforced by Wardani and Subowo (2020), who argued that tax-deductible interest on short-term debt can increase after-tax profits. Other researchers, including Shikumo et al. (2020) and Ajibola (2018), found a strong positive correlation between short-term debt and ROA, particularly when firms follow a conservative investment strategy. However, the present study contradicts Zeitun and Goaid (2021), who found that excessive short-term debt in Japanese firms led to increased financial risks and lower profitability due to high interest costs. Similarly, Filipovic and Demirovic (2016), Wamugo et al. (2014), and Muchugia (2013) argue that excessive short-term debt can create conflicts between shareholders and creditors, negatively affecting profitability. The inconsistencies in findings may stem from differences in research methodologies and contextual factors.

Regarding long-term debt, the study found that an increase in long-term debt by one unit resulted in a 0.1448 percentage point decrease in profitability, with statistical significance. This finding aligns with research by Aziz (2019), Omete and Asabwa (2017), and Yazdanfar and Ohman (2015), who observed that long-term debt negatively affects firm profitability due to fixed interest obligations, which can strain cash flow and lead to financial distress. Aziz (2019) highlighted that regardless of a firm's financial standing, long-term debt repayment is mandatory, which may reduce profitability during economic downturns. Omete and Asabwa (2017) noted that higher financial leverage increases financial risk, potentially leading to significant losses during market downturns. Similarly, Shikumo, Oluoch, and Matanda (2020) found that long-term debt incurs additional costs, including interest payments and restrictive covenants, limiting financial flexibility. Furthermore, Koila, Kiru, and Koima (2018) argue that restrictive debt agreements can hinder firms from adapting to market changes or seizing new opportunities, ultimately reducing profitability. Overleveraging, where a firm accumulates unsustainable debt levels, can lead to higher default risks, increased borrowing costs, and difficulty in raising additional capital (Shikumo et al., 2020). The risks are further exacerbated by fluctuating interest rates, which can increase the cost of long-term debt and reduce profitability (Koila et al., 2018).

However, the study contradicts Agency Theory, proposed by Jensen and Meckling (1976), which advocates for high debt financing to mitigate agency conflicts and improve firm value. Some studies suggest that long-term debt does not always negatively affect profitability. For instance, Hasan et al. (2021) argue that reduced interest payments can relieve cash flow pressures and enhance profitability. Fatoki and Kibunja (2020) found that lower interest costs associated with long-term debt can increase net income and overall financial performance for firms listed at the NSE. Additionally, Atheru and Mutua (2020) challenge the trade-off approach to capital structure, arguing that long-term debt provides stable funding, allowing businesses to focus on long-term projects that enhance growth and profitability. Fatoki and Kibunja (2020) further highlight that firms can leverage long-term debt to expand their asset base, increasing returns on equity without diluting ownership. If the return on investment from borrowed capital exceeds the cost of debt, profitability and shareholder value can improve.

The study also explored the relationship between the debt tax shield and profitability. The results showed that a unit increase in the debt tax shield led to a 0.1459 percentage point decrease in profitability, but the effect was statistically insignificant at a 5% significance level. This indicates that the debt tax shield does not significantly influence overall financial profitability. Debt tax shield refers to the tax savings a firm gains from interest payments on debt, which reduces taxable income and lowers overall tax liability. The findings are consistent with research by Adobo (2022) and Sriharan (2015), who studied financing choices in Sri Lankan firms. Adobo (2022) found that excessive reliance on debt to benefit from the tax shield can lead to overleveraging, increasing financial risk and offsetting potential tax benefits. High levels of debt may also expose firms to financial distress and bankruptcy risks, particularly when interest rates are high or cash flows are unstable. Additionally, excessive debt can reduce a firm's credit rating, increasing the cost of future borrowing and negatively impacting profitability (Sriharan, 2015). If a company's earnings before interest and taxes are low, interest expenses can significantly reduce net income, even with the tax shield benefit.

However, the present findings contradict those of Karuma et al. (2018), who found that the debt tax shield significantly improves return on assets (ROA). Karuma et al. (2018) argue that since

interest payments are tax-deductible, they reduce taxable income and corporate tax liabilities, thereby increasing net income and profitability. The tax shield also makes debt a more attractive financing option than equity, as firms can reduce their overall cost of capital and fund more profitable projects. Koila et al. (2018) further suggest that well-managed debt can enhance returns on equity (ROE) through the leverage effect, particularly when returns on investment exceed the cost of debt. The debt tax shield can lower the effective cost of borrowing, enabling firms to expand their operations and improve financial performance. The study provides valuable insights into the relationship between debt and profitability. The findings indicate that both short-term and long-term debt negatively affect profitability, with long-term debt imposing higher financial risks due to fixed obligations and restrictive covenants. While some studies support the positive impact of short-term debt on profitability through tax advantages and working capital efficiency, excessive reliance on debt increases financial risks and limits operational flexibility. The debt tax shield's effect on profitability was found to be insignificant, suggesting that while tax deductions on interest payments offer some benefits, they may not be enough to offset the risks associated with high debt levels. The conflicting findings in existing literature highlight the complexity of the relationship between debt and profitability, with variations in results arising from differences in research contexts, industry characteristics, and economic conditions. Firms must carefully balance their debt levels to optimize profitability while minimizing financial risk.

5. CONCLUSION

The study findings indicate that debt financing can be beneficial for businesses, especially when used to enhance asset utilization. However, different dynamics exist in debt refinancing. Short-term debt negatively affects the profitability of manufacturing companies listed on the NSE. This decline is attributed to rising interest rates, frequent refinancing needs, and higher liquidity risks. Companies that rely heavily on short-term debt often experience lower profits due to increased financial obligations. Similarly, long-term debt also negatively impacts profitability, though its effect is less severe due to lower interest rates and extended repayment periods. This allows for better financial stability and flexibility, which may contribute to improved returns on assets. The study also examined the

effect of the debt tax shield on profitability. Although it had a positive coefficient, its impact was statistically insignificant. This suggests that while tax benefits from interest payments may provide some financial relief, they do not significantly influence profitability. Instead, other factors such as operational efficiency and effective debt management play a more crucial role in determining financial performance. Overall, businesses must carefully consider their debt financing strategies to balance financial stability and profitability.

6. RECOMMENDATION

Manufacturing companies listed on the NSE should maintain liquidity buffers and limit reliance on short-term debt to mitigate refinancing risks. Financial institutions and policymakers should offer low-interest, short-term financing solutions to ease costs. Regulators like the Capital Markets Authority (CMA) should require companies to disclose short-term debt management plans to ensure financial stability. For capital-intensive industries, the government and financial institutions should provide credit guarantees or discounted rates to facilitate long-term loans. Tax incentives should be introduced or improved to encourage sustainable long-term debt arrangements. Additionally, regulators should assist firms in converting costly short-term loans into long-term debt to stabilize cash flows and improve profitability. Companies must balance borrowing with asset utilization, while the government should lower corporate income tax rates to enhance profitability. To reduce overreliance on loans, alternative funding sources should be promoted.

Despite the statistically insignificant effect of the debt tax shield on profitability, tax deduction procedures for interest charges should be simple and transparent to incentivize firms to maximize its benefits. Companies should adopt a mix of debt and equity financing to avoid over-leveraging, which could diminish the effectiveness of tax shields. Regulators should establish guidelines to help firms assess whether the tax shield benefits outweigh the risks of excessive debt accumulation. This approach can prevent businesses from taking on unsustainable debt levels that may lead to bankruptcy.

Policymakers should focus on reducing the risks of short-term borrowing and encouraging strategic use of long-term debt to ensure sustainable debt management. Debt financing

should not compromise financial stability but should provide businesses with opportunities to benefit from tax shielding. Manufacturing companies should balance their short- and long-term debt to optimize their capital structure. While the debt tax shield can enhance profitability, companies should exercise caution to avoid excessive risk. Strategic refinancing and regular financial evaluations will help maintain an ideal debt structure for long-term profitability.

For further research, future studies should explore other financial metrics beyond Return on Assets (ROA) to assess the relationship between debt financing and profitability. Primary data collection methods should be employed to gain deeper insights into the complexities of this relationship. Research should also extend beyond the manufacturing sector to include industries such as banking, petroleum, energy, and education, allowing for comparative analysis. Future studies should utilize larger data sets, spanning over twenty years, to enhance the accuracy and reliability of findings. A broader dataset covering more manufacturing firms will improve regression models, leading to more precise and symmetrical results that better reflect industry trends.

ETHICAL APPROVAL

Ethical considerations were strictly followed in accordance with research regulations at Kenyatta University and national guidelines in Kenya. The researcher obtained an authorization letter from the university and applied for a research permit from the National Commission for Science, Technology, and Innovation (NACOSTI). These steps ensured compliance with ethical research standards and facilitated the smooth progression of the study.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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